

housing 2930 of the gaming machine. In one alternative, the floating assemblies 2910a-c can be mounted directly to the housing 2930 of the gaming machine.

[0165] FIG. 29 further illustrates a video projector 2950 for projecting images onto the projection surfaces 2913a-c. The video projector 2950 can be coupled to a controller that includes, for example, a video source that includes a program for generating the output images projected by the video projector 2950. The illustrated embodiment shows the video projector 2950 displaying images of symbols 2955a-c onto the projection surfaces 2913a-c. The symbols 2955a-c can be of the type generally found on a slots game (e.g., WILD, lemon, cherry, BAR, number 7, etc.). The video projector 2950 can also display images that simulate the mechanical reels of a slots machine as discussed previously. For example, the video projector 2950 can project images that include imperfections associated with a mechanical reel such as an imperfect edge, a flaw in a symbol, shadowing, a jitter, a wobble, etc. The floating screen assemblies 2910a-c, when operating together with a video projector 2950, have the appearance of spinning reels that include the sidewalls and the reel strip expected to be found on a mechanical slots game.

[0166] The video projector 2950 illustrated in FIG. 29 projects a single output of a main image area that includes three independent display regions or subareas 2918a-c. The subareas 2918a-c are projected onto the three projection surfaces 2913a-c. For example, the main image output from the video projector 2950 includes the subarea 2918a which is projected onto projection surface 2913a. The main image output also includes the subareas 2918b, c which are projected onto projection surface 2913b, c, respectively. The subareas 2918a-c can include images of symbols or other representations for simulating a mechanical reels. Similar to a slots game, the symbols from all or a portion of the subareas 2918a-c can be used to select an outcome of the wagering game.

[0167] The video projector 2950 can have a high-definition (HD) type of output that includes high brightness levels. The image output from the video projector 2950 is generally sized based on the size and layout of the projection surfaces 2913a-c of the floating screen assemblies 2910a-c and the distance between the video projector 2950 and projection surfaces 2913a-c. In one embodiment, the video projector 2950 can display an image having approximately a 15-inch diagonal that contains subareas 2918a-c which depict the individual reels of the slots game.

[0168] The embodiment illustrated in FIG. 29 can include dynamic control of the physical movements in the x, y and z directions (that is, up and down, left and right, and forwards and backwards or any combinations thereof) of the floating screen assemblies 2910a-c to simulate mechanical reels. In certain embodiments, the x and y directions (that is, up and down and left and right) can also be controlled for each of subareas 2918a-c within the main image area projected by video projector 2950. In one embodiment, the subareas 2918a-c can move six pixels in any one of the x and y directions within the main image area. In certain embodiments, the subareas 2918a-c can move from approximately 1 millimeter to 2 millimeters in any one of the x and y directions within the main image area. In some embodiments, the subareas 2918a-c can move up to 2 millimeters

in any one of the x and y directions within the main image area. In certain embodiments, the movement of a subarea 2918 in the x and/or y direction is synchronized to the movements in the same x and/or y direction of the corresponding floating screen assembly 2910. The movement between adjacent floating screen assemblies can be coordinated to simulate imperfections between adjacent mechanical reels in a slots game.

[0169] The movement of one of subareas 2918a-c projected onto the corresponding projection surfaces 2913a-c is synchronous with and in the same x and/or y direction and over the same x and/or y distance as the corresponding floating screen assembly 2910. Thus, while a subarea 2918a-c may be moving within the main image area, the images projected onto a projection surface 2913a-c should not appear to a player to be moving relative to the respective one of floating screen assemblies 2910a-c. The subareas 2918a-c of images projected onto the projection surface 2913a-c along with the movements of the floating screen assembly 2910a-c can then give the appearance of a mechanical reel used in a slots game.

[0170] The synchronized movements between subareas 2918a-c and the floating screen assemblies 2910a-c can be achieved in different ways. For example, a floating screen assembly 2910 can be provided with a position detector (not shown). The position detector for each floating screen assembly 2910a-c can be synchronized and coordinated using the controller so that the subareas 2918a-c correspondingly move so that the images displayed on each projection surface 2913a-c do not appear to be moving relative to the movement of each floating screen assembly 2910a-c.

[0171] In certain embodiments, an actuation device mechanically connected to the frame 2916a-c can be used to develop slight harmonic or cyclic physical movements in the floating screen assemblies 2910a-c. For example, a motor with an eccentric shaft can be used to apply slight harmonic motion to a frame 2916 during the presentation of images simulating the rotation of a mechanical reel. The actuation device can further be controlled to simulate a hard stop and shimmy, similar to what can occur for an actual mechanical reel device. The implementation of such physical movements can be applied in the embodiments illustrated in FIG. 29, as described previously, for example, for FIGS. 27-28.

[0172] The movements applied to the frames 2916a-c are based on dynamic events for a spinning reel cage, including starting, spinning and stopping. Each dynamic event has unique characteristics and resonance patterns. For example, while presenting images, an out of phase movement can be imparted to give the appearance that the floating screen assembly 2910 resonates along the simulated axis of rotation, similar to what occurs when a mechanical reel device is braking or coming to a stop. In one embodiment, movement of the floating screen assembly can be initiated based on specific commands from a controller to a motor coupled to a frame 2916 for a floating screen assembly 2910.

[0173] While the illustrated embodiment in FIG. 29 has three floating screen assemblies 2910a-c, fewer or additional assemblies can be used depending on the wagering game. For example, in certain embodiments, five floating screen assemblies are used. In certain embodiments, multiple video projectors and/or displays with multiple floating screen assemblies and/or displays can also be used.